

It is claimed:

1. A method for hydrating particulate polymer in a hydration apparatus, the method comprising:

transferring substantially dry particulate polymer from a storage assembly to a hydration unit;

pre-wetting the substantially dry particulate polymer with a hydration fluid in a pre-wetter to form a gel;

mixing the gel with additional hydration fluid in a high-energy mixer;

blending the gel in a blender; and

removing entrained air from the gel in a weir tank.

2. The method of claim 1, wherein the step of transferring substantially dry particulate polymer further comprises:

metering the particulate polymer from a tote tank to a collection chamber with a metering auger; and

transferring the particulate polymer from the collection chamber to a discharge chamber with a transfer auger.

3. The method of claim 2, wherein the metering auger and the transfer auger are automatically controlled in response to the amount of hydrating fluid being drawn into the apparatus.

4. The method of claim 1, wherein the step of pre-wetting the substantially dry particulate polymer further comprises:

inducing a cyclonic flow pattern of the hydration fluid in the pre-wetter; and

introducing the substantially dry particulate polymer into the hydration fluid

having a cyclonic flow pattern.

5. The method of claim 1, wherein the step of mixing the gel further comprises imparting energy to the gel with an impeller inside the high-energy mixer.

6. The method of claim 1, wherein the step of mixing the gel further comprises:

introducing the gel into an eductor mixer; and

combining the gel with accelerated hydration fluid in the eductor mixer.

7. The method of claim 1, wherein the step of blending the gel further comprises producing a rolling turbulence in the gel with one or more agitators.

8. The method of claim 7, wherein the step of producing a rolling turbulence further comprises contacting the gel with one or more blender discs.

9. An apparatus for hydrating particulate polymer, the apparatus comprising:

a storage assembly;

a delivery assembly connected to the storage assembly; and

a hydration assembly connected to the delivery assembly, wherein the hydration

5 unit comprises:

a pre-wetter;

a high-energy mixer; and

a blender.

10 10. The apparatus of claim 9, wherein the storage assembly further comprises:

at least one tote tank; and

a receiving rack configured to support the at least one tote tank.

11. The apparatus of claim 10, wherein the at least one tote tank further

15 comprises:

an anti-bridging cone; and

a knife shut-off valve.

12. The apparatus of claim 10, wherein the receiving rack further comprises

20 one or more pneumatic vibrators.

13. The apparatus of claim 9, wherein the delivery assembly further comprises:

a metering auger;

a collection chamber;

5 a transfer auger; and

a discharge chamber.

14. The apparatus of claim 13, wherein the transfer auger is flexible.

10 15. The apparatus of claim 9, wherein the pre-wetter is configured to induce a cyclonic flow pattern as hydration fluid enters the pre-wetter.

16. The apparatus of claim 9, wherein the high-energy mixer further comprises:

15 a housing; and

a rotating impeller.

17. The apparatus of claim 16, wherein the impeller includes a plurality of vanes that have cupped surfaces.

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18. The apparatus of claim 16, wherein the impeller includes a plurality of vanes that include one or more holes.

19. The apparatus of claim 9, wherein the blender further comprises one or more blender discs that create a rolling turbulence when rotated in the presence of the gel.

20. The apparatus of claim 9, further comprising a weir tank having one or more steps.

21. The apparatus of claim 9, further comprising:

an intake manifold configured to draw hydration fluid into the apparatus;

a pump connected to the intake manifold; and

a discharge manifold configured to discharge gel to downstream equipment or storage facilities.

22. An apparatus for hydrating particulate polymer, the apparatus comprising:

a storage assembly, wherein the storage assembly includes one or more tote tanks

supported by a receiving rack;

a delivery assembly connected to the storage assembly; and

a hydration assembly connected to the delivery assembly, wherein the hydration unit includes an eductor mixer.

23. An apparatus for hydrating particulate polymer, the apparatus comprising:

means for storing the particulate polymer;

means for hydrating the particulate polymer; and

means for delivering the particulate polymer from the means for storing the

5 particulate polymer to the means for hydrating the particulate polymer.